Claims

What is claimed is:

1. A method of adjusting an application of a fuel injection limiting map, comprising the steps of:

estimating a performance difference between at least one fuel injector and a like number of nominal fuel injectors; and

adjusting an application of a limiting map if said performance difference exceeds a predetermined value.

2. The method of claim 1 wherein said at least one fuel injector is a plurality of fuel injectors in a fuel injection system;

said estimating step includes a step of determining a deviation in fuel consumption between said fuel injection system and a nominal fuel injection system; and

said adjusting step is performed identically for each of said plurality of fuel injectors.

3. The method of claim 1 wherein said adjusting step includes the steps of:

determining a desired quantity of fuel to inject;

determining a maximum quantity of fuel to inject using a limiting map; and

choosing a lessor of said desired quantity and said maximum quantity as an actual quantity of fuel to inject;

determining an injector on time that corresponds to said actual quantity; and

adjusting said on time as a function of said performance difference.

4. The method of claim 1 wherein said adjusting step includes the steps of:

determining a desired on time;

adjusting a nominal limiting map to an adjusted limiting map as a function of said performance difference;

determining a maximum on time using said adjusted limiting map; and

choosing a lessor of said desired on time and said maximum on time as an actual on time.

5. The method of claim 1 wherein said at least one fuel injector is a plurality of fuel injectors in a fuel injection system;

said estimating step includes a step of determining a deviation in fuel consumption between each fuel injector and a nominal fuel injector; and

said adjusting step is performed for each fuel injector based upon said deviation for that fuel injector.

6. The method of claim 1 wherein said adjusting step includes a step of adjusting an application of a torque limiting map if said performance difference exceeds a predetermined value.

7. The method of claim 1 wherein said adjusting step includes a step of adjusting an application of a smoke limiting map if said performance difference exceeds a predetermined value.

8. A fuel injection system comprising:

a plurality of fuel injectors;

at least one electrical actuator operably coupled to control operation of said fuel injectors; and

an electronic control module in control communication with said at least one electrical actuator, and including means for adjusting an application of a limiting map if a performance difference between at least one of said fuel injectors and a like number of nominal fuel injectors exceeds a predetermined value.

9. The fuel injection system of claim 8 wherein said limiting map is a torque limiting map.

10. The fuel injection system of claim 8 wherein said limiting map is a smoke limiting map.

11. A method of reducing smoke emissions from an engine having an electronically controlled fuel injection system, comprising the steps of:

providing an electronic control module with a nominal smoke limiting map; and

adjusting an application of said smoke limiting map if said fuel injection system performance deviates from a nominal system performance by a predetermined value.

12. The method of claim 11 wherein said adjusting step includes an application of said smoke limiting map to each fuel injector if that fuel injector performance deviates from a nominal fuel injector performance by a threshold value.

13. The method of claim 11 wherein said adjusting step includes applying an identical adjusted smoke limiting map to all fuel injectors in the fuel injection system.